

REMARKS/ARGUMENT

Request for Continued Examination

An RCE has been filed herewith.

Claims in General

Claims 35, 36, 40, 47-49, 60, 64-65, and 67-124 are now pending before the Examiner. By the present Communication, claims 35, 67, 114, and 115 have been amended to better highlight certain distinctions over the newly applied references. Also, claim 70 has been amended to correct a minor editing error.

New claims 119-124 has been added to provide Applicants additional protection to which they appear to be entitled in light of the prior art.

Allowable Subject Matter

Applicants note with appreciation the indication in the outstanding Office Action that claims 70, 71, 80, 82, 89, 90, 94, 97, 101-103, 107, and 110-113 would be allowed if amended or rewritten to incorporate the limitations of their respective parent claims. Because these claims are all directly or indirectly dependent on one of claims 35, 48, or 67, which are believed to be allowable as explained below, they have been retained in dependent form pending the Examiner's further consideration.

With respect to claim 101, this has been indicated to be allowable, and also as anticipated by the Kearby et al. U.S. Patent 5,762,270 (Kearby). For purposes of the discussion below, claim 101 will be treated as having been rejected.

The Personal Interview Held November 2, 2006

Applicants and their representatives gratefully acknowledge the courtesy and assistance afforded to them by Examiner Hwu during the interview. The Examiner's Interview Summary accurately summarizes the subjects discussed. Further amplification appears below as required.

The Prior Art Rejections

In the outstanding Office Action, claims 35, 36, 40, 47, 98-101, and 115-118 are rejected under 35 U.S.C. §102(b) as being anticipated by Kearby, and claims 35, 48, 49, 60, 64, 65, 67-69, 72-79, 81, 83-88, 91-93, 95-96, 98-100, 104-106, 108, 109, and 114 are rejected under 35 U.S.C. §102(b) as being anticipated by Lindermeir et al. U.S. Patent 5,226,559 (Lindermeir).

Applicants respectfully traverse all of these rejections.

The Kearby §102(b) Rejection

Claim 35 as amended recites:

a valve including a substantially conical valve element rotatably mounted at a fixed axial position in the nozzle housing flow path, wherein rotation of the valve element between open and closed positions controls water flow to the angled portion of the nozzle housing flow path.

Kearby's valve element is not mounted at an axially fixed position, nor is it constructed to control water flow due to its rotation. Instead, Kearby's sprinkler has an in-line valve mechanism comprised of a valve seat 60 and a valve element 62 by which water entering the sprinkler at 14 is shut off from access to nozzle 52. Valve element 62 is moved axially to open and close the valve by an actuator rod 64 and an actuator member 66 which is rotatable by a tool slot 80 in its top surface. Cams 70 and 72 projecting from actuator member 66 cooperate with helical cam slots 74 and 76 to move actuator rod 64 and valve element 62 up and down as actuator member 66 is rotated.

In the outstanding Office Action, the Examiner appears to treat the beveled face of valve element 62 which interacts with the valve seat 60 as "conical". However, as pointed out during the interview, while valve element 62 does rotate due to the camming action of helical slots 74 and 76 with pins 20 and 72, as actuator member 66 moves axially, it is the axial movement, and not the rotation, which opens and closes the valve. Kearby's valve would work the same if an outer ring including helical slots 74 and 76 were arranged to rotate. In that case, rod 64 would not rotate as it moved up and down to open and close the valve.

Applicants believe that, subject to further consideration, the Examiner agrees that the amendments to claim 35 patentably distinguish it over Kearby.

Independent claim 115 is also patentable over Kearby. This claim calls for:

... a nozzle housing having a main flow passage therein for receiving water from a supply source and an outlet passage through which water flowing in the main flow path exists the sprinkler assembly;

a rotary drive mechanism for the nozzle housing;

a manually adjustable arc setting mechanism on a center axis of the sprinkler assembly for setting an arc of coverage for the sprinkler;

a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

a valve disposed upstream of the nozzle for controlling flow of water to the nozzle,

the valve being so constructed that it does not interfere with the center axis arc setting mechanism.

Kearby does not disclose, teach, or suggest a center-axis manually adjustable arc setting mechanism, in combination with a valve which is "so constructed that it does not interfere with the center axis arc setting mechanism". Applicants believe that the Examiner agrees that the recited features patentably distinguish claim 115 over Kearby.

The Lindermeir §102(b) Rejection

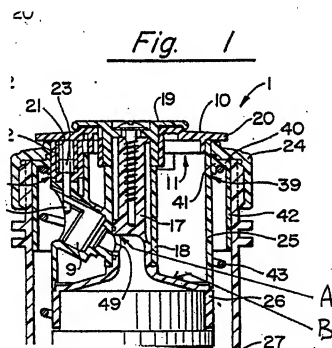
Amended claims 35 and 114 and new claim 119 call for a valve having a "substantially conical valve element" which moves or rotates to control water flow to the nozzle. Lindermeir does not include this feature. The moveable valve element in Lindermeir, i.e., sleeve 18, is not "substantially conical".

With reference to Lindermeir, Figures 1, 3, and 4 show a sprinkler head 6 having three circumferentially spaced nozzle units 9 and a valve, described below, which can selectively connect one of the nozzles to the incoming water supply, or can be positioned to cut off the flow of water to all of the nozzles.

The valve, which is not specifically called out by reference number in the patent, is comprised of an open-ended cylindrical member 18 centrally located in sprinkler head 6. The patent

refers to this as a bearing sleeve, and it essentially functions as the moving element of a sleeve valve. Bearing sleeve 18 is integrally connected to three casing-like hollow spokes 48 which communicate with the respective nozzle units 9. The spoke interiors communicate with the interior of bearing sleeve 18 by way of supply openings 49 in the jacket of the bearing sleeve 18.

Sleeve 18 is mounted on a bearing shaft 17, which is an extension of the rotary drive mechanism for the sprinkler. Shaft 17 is rotationally fixed relative to bearing sleeve 18, and thus carries sleeve 18 to oscillate the sprinkler head 6 over the desired arc of coverage. The lower end of shaft 17 is hollow, and communicates with a water supply connected to a nipple 44. Water is supplied to one of spokes 48, and hence to one of nozzles 9 by selective alignment of a single opening in bearing shaft 17 with one of openings 49 in bearing sleeve 18 by rotation of sleeve 18 on shaft 17. The opening in bearing shaft 17 is unlabeled in the patent drawings, but is designated at "A" in the fragmentary copy of Fig. 1 reproduced below.



Bearing sleeve 18 is rotatable relative to shaft 17 by means of a selecting mechanism including a nozzle selecting handle 10 and a circular disk-like gripping ring 20. The combined

mechanism referred to above is described in Lindermeir primarily at Col. 6, line 44 through Col. 7, line 6, and Col. 9, line 52 through Cl. 10, line 10.

Applicants believe from the discussion during the interview that the Examiner agrees with Applicants' position that Lindermeir does not include a "substantially conical valve element" which moves or rotates to control water flow to the nozzle.

Independent claims 48 and 67 are also patentable over Lindermeir. In particular, claim 48 calls for:

... a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

a valve disposed in the nozzle housing which is operable between open and closed positions to control water flow between the main and angled portions of the nozzle housing flow path,

the valve being so constructed and configured that the parts thereof which are in the water flow path provide a *single angular transition* between the main and angled portions of the flow path when the valve is in a fully open position.

Col. 9, lines 58 and 59 of Lindermeir describe supply openings 49 as "positioned roughly radially", while Col. 9, line 60 describes the communicating opening in bearing shaft 17 (i.e., the element labeled A in the drawing above), as a "radial flow opening". As illustrated in Fig. 3, openings 49 are oriented such that the water flow into spokes 48 is aligned with the axial direction of reception flange 50 which forms the inlet end of the flow passages for the nozzles 9. With opening A in bearing shaft being radial, the upwardly flowing water must make a sharp right-angle turn to pass through opening A, and a second obtuse-angle turn into opening 49. Thus, there is no "single angular transition" as called for by claim 48.

During the interview, Applicants proposed the claim term "single angular transition." Applicants believe that, subject to further consideration, the Examiner agrees that this feature patentably distinguishes claim 48 over Lindermeir.

Claim 67 as amended recites the following:

a nozzle housing having a main flow path formed therein for directing a flow of water received in the sprinkler assembly and a water stream

outlet flow path through which water flowing through the flow path exits the sprinkler assembly;

a transition portion between the main flow path and the stream outlet flow path,

a nozzle removably mounted in the stream outlet for distributing water from the sprinkler assembly; and

a valve disposed in the nozzle housing upstream of the nozzle for throttling or shutting off flow to said nozzle,

the valve having a movable valve element which is independent from other functional elements, the valve element being movable within the nozzle housing flow path between open and closed positions to control water flow to the nozzle,

wherein a downstream end of the transition portion, an upstream end of the stream outlet flow path, and an opening in the valve element are all substantially aligned when the valve element is in the open position.

Lindermeir does not disclose, teach, or suggest a "valve having a movable valve element which is independent from other functional elements". Moving element 18 is integral with outer jacket 25 and spoke assembly 48 (see col. 9, line 52-col. 10, line 10).

Lindermeir also does not disclose, teach, or suggest a sprinkler assembly including a valve as described "wherein a downstream end of a transition portion, an upstream end of a stream outlet flow path, and an opening in the valve element are all substantially aligned when the valve element is in the open position". Even if the opening in shaft 17 is regarded as a downstream end of a transition portion, reception flange 50 is regarded as an upstream end of a stream outlet flow path, with the opening in shaft 17 radially oriented, and opening 48 aligned with the nozzle flow path, the flow path jogs between these locations, and the three parts are not aligned when the valve is open. Claim 67 is patentable over Lindermeir for at least these reasons. Applicants believe that the Examiner agrees, subject to further consideration, that these features patentably distinguish claim 67 over Lindermeir.

Finally, Applicants note that claim 115, while it has not been rejected over Lindermeir, is patentable over that reference nevertheless. Claim 115 recites a center-axis manually adjustable arc

setting mechanism, in combination with a valve which is "so constructed that it does not interfere with the center axis arc setting mechanism"

Lindermeir does not include this feature. In Lindermeir, the arc of coverage setting mechanism described in Columns 5-7 is coupled to the central shaft 17 which is driven by rotary drive 7. Thus, rotation of sleeve 18 relative to shaft 17 to operate the valve disturbs an existing arc setting, which might be difficult to restore precisely when the valve is reopened.

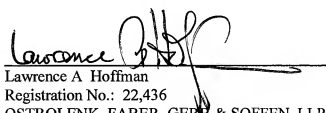
Rejected claims 36, 40, 47, 64, 65, 85-88, 91-93, and 95-100, and new claims 120-123 are directly or indirectly dependent on allowable claim 35, rejected claims 49, 60, 104-106, 108, and 109 are directly or indirectly dependent on allowable claim 48, rejected claims 68-69, 72-79, 81, 83, and 84, and new claim 124 are directly or indirectly dependent on allowable claim 67, and rejected claims 116-118 are directly or indirectly dependent on allowable claim 115. These claims are, therefore, also allowable over Kearby and Lindermeir for at least the reasons stated above. In addition, these claims recite features which, in combination with the features of their respective parent claims, are neither taught nor suggested in Kearby or Lindermeir, or other known art, whether considered singly, or in combination.

In view of the foregoing, Applicants respectfully request favorable reconsideration and allowance of this application.

Respectfully submitted,

THIS CORRESPONDENCE IS BEING
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LAH:lac



Lawrence A Hoffman
Registration No.: 22,436
OSTROLENK, FABER, GERB & SOFFEN, LLP
1180 Avenue of the Americas
New York, New York 10036-8403
Telephone: (212) 382-0700